NON-TOXIC

Remedies.

BY

Dr. F. von Heyden Nachfolger.

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BY

Dr. F. von Heyden Nachfolger,

RADEBEUL, NEAR DRESDEN

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    Solveol—A NON-TOXIC PHENOL FOR SURGEONS, GYNÆCOLOGISTS, ETC.

POISONS RENDERED INNOCUOUS;

OR,

NON-TOXIC REMEDIES.

INTRODUCTION.

THE following paper deals with some of the most recent advances in Medical Science.

Before submitting the facts to our readers, however, it will not be unadvisable, in the interests of the public, to make a passing allusion to a so-called "method" of treatment which has, of late, attracted some popular attention, more especially in Germany, the Fatherland of Science.

This method of treatment has been termed the "natural cure," and presumes to array itself against medical treatment, based on the experience and scientific development of a thousand years.

This "natural" treatment pretends to cure without the aid of medicine, and affects to be independent of science; its apparent popularity has been due, to no small extent, to the clever, or rather cunning, manner in which its "advantages" have been advertised and spread abroad among that lay portion of the public which is ever too ready to believe anything with a scientific flavour, as the true gospel of science. At one time the advertisement has taken the form of a popular public lecture; at another, the guise of a medical pamphlet, in which some such pleasing suggestion as "the natural curative forces of the body without the assistance of medicine," or some more terrible phrase, such as "medicinal poisoning," plays a prominent part.

But scientific medicine can afford to smile at these empty phrases, the mere statement of which constitutes (to quote Lord Macaulay) their own refutation, and, indeed, if it were necessary, has found a powerful antidote to them in the discovery of *non-toxic remedies.*

It is true that medicinal poisoning has occurred in the past, and might occur again; therefore modern medicine must endeavour to replace poisonous drugs with less injurious substances, but, better still, by *non-poisonous remedies*, the production of which is now an accomplished fact, thanks to the assistance of modern chemistry.

Chemistry is, indeed, still "the handmaid of medicine," and, as is well known, takes high rank in Germany; hence it is that these non-toxic drugs are of German origin. Medicine has, in fact, for some years past possessed a wealth of these remarkable remedies, some of which, notwithstanding their comparative newness, have come into general use—a sure sign that they indicate not only a scientific, but a practical step forward.

It is, however, much to be regretted that a considerable number of them remain unheeded. The explanation of this lies, no doubt, in the fact that the majority of medical practitioners are unable to spare the time from their arduous labours which is necessary for the proper study of these drugs, or to follow, in detail, the special scientific progress of which they are the outcome. Moreover, the many notices relating to these and similar matters which appear in scientific literature are, unfortunately, scattered through endless journals, the reading of which becomes a hopeless task to a busy man.

Bearing these various circumstances in mind, we have compiled the following summary of recent researches in connection with non-toxic remedies which, we venture to think, will supply a long-felt want.

We have confined ourselves in this summary to real remedies—*i.e.*, to such as attack the root of the disease—and have not included those which only allay symptoms like the modern antipyretics

NON-TOXIC REMEDIES

IN

INFECTIOUS DISEASES.

It is universally admitted that infection is a common cause of disease. Now remedies against infectious disease must either

(1) *kill the disease germs or*

(2) *arrest their development, so that their poisonous action is reduced to a minimum, or*

(3) the poisons produced by the agency of the germs must either be

  (*a*) *converted into non-poisonous compounds or*

  (*b*) *removed from the system.*

If the remedy acts in the sense of (2) or (3) the system will, in itself, be in a position to achieve the destruction of the germs.

To modern medicine is due the discovery of the causes of infectious diseases, but modern chemistry has further discovered the material necessary for and capable of effecting their removal.

Those substances which have proved to be antiseptics in the fullest sense of the word belong to the class of phenols, *e.g.*, phenol (carbolic acid), cresol, naphthol, thymol, chlorophenol, tribromo-phenol, guaiacol, creasote, eugenol, pyrocatechin, pyrogallol, etc. That these phenols act as germ destroyers, or that they arrest germ development outside the system is known, but within the system their action is by no means so definite, since they are antiseptics only so long as absorption does not occur. They act, therefore, only on disease germs in the stomach or intestine. So soon as the phenols are absorbed their antiseptic power is suspended. During absorption they form non-antiseptic compounds, for, according to the experiments of Hoelscher, the blood does not become sterile even after large doses of guaiacol (*Berl. Klin. Wochenschrift*, 1892, No. 3).

After absorption, therefore, the phenols do not retain their direct action against disease germs; on the other hand, they exert another action, and a remarkable one, namely, *a de-poisoning* action—if we may use the expression.

There seems to be every reason, according to the thorough investigations of Seifert and Hoelscher (*Berl. Klin. Wochenschrift*, 1892, No. 3), to believe that the phenols after absorption effect a de-poisoning of the body by combining with and eliminating the toxic albumens produced by the action of disease germs; the phenols are not present in the blood in the free state—they are separated in the urine as ethereal sulphates: these salts must have resulted from the oxidation of some compound of the phenols with albumen. In the act of absorption, therefore, the phenols combine with albuminous substances, and especially with the most reactive of these, viz., the toxic albumens, the products of germ vitality. Probably these compounds of the toxic albumens with phenols are non-toxic: they must very rapidly undergo oxidation in the system, since the phenols quickly appear in the urine as ethereal sulphates. On this theory of the elimination of the toxic albumens from the body, the remarkable action of guaiacol carbonate in phthisis is explained, since, in its case, any direct action on bacilli or stomachic effects, are equally excluded.

The phenols act, therefore, in the stomach and intestine directly upon the disease germs, and after absorption they effect the elimination of the toxic albumens from the system.

These phenols, which so obviously take the highest rank as remedies against infectious diseases, are, unfortunately, extremely poisonous in the free or uncombined state. They have a caustic action; they destroy the skin; they have usually a powerful and offensive odour, and an intensely burning taste; they exert on certain nerves an extremely irritating action, and easily induce vomiting. For these reasons it is sufficiently clear that they can only be introduced in very small quantities into the system—in quantities which are insufficient for any real antiseptic effect.

In order to render them available remedies, it is necessary to remove from them their harmful properties.

Contradictory as this statement appears, this object has, nevertheless, been achieved by combining phenols with organic acids (for example, with salicylic and benzoic acids), with carbonic acid, and quite recently with bismuth.

In this manner has arisen those large groups of remedies which are included under the appellations of **salols, carbonates,** and **bismuth-phenols.**

These substances deserve, in the fullest sense of the phrase, the name of *non-toxic poisons,* for the quantity of phenols which may be introduced into the system without injury by the instrumentality of these drugs may truly be said to be enormous, when compared with the maximum doses of the free or uncombined phenols. For example, it is possible to give patients 90 grains per day of phenol in the form of salol, while the maximum dose for free phenol is 8 grains. This dose of salol may even be considerably increased*; it is, however, to be noted that in chronic kidney disease salol may exert a poisonous action. The number of non-toxic remedies is, however, so large that it is not difficult to substitute in such cases another remedy for salol, *e.g.*, betol or tribromo-phenol-bismuth, which has a very favourable action on the kidneys (Hueppe, *Berl. Klin. Wochenschrift,* 1893,

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* As a matter of fact, as much as 53 grains per lb. (equivalent to 18 ozs. for a man of 11 stone) had to be given in order to produce a fatal effect.

No. 7, p. 163), or by guaiacol carbonate or creasote carbonate, of which substances rabbits are able to take 20 grains and more without injury.

In addition to their non-poisonous nature, these remedies differ from the free and poisonous phenols in that they are neutral, and not caustic, being without action even on the most sensitive mucous membrane; they are, further, almost odourless and flavourless; they exert, therefore, no action on the nerves of taste and smell, nor do they induce that extreme irritation on the digestive apparatus of the patient which is so marked in the case of the free phenols, and to which attention has already been drawn.

The salols, as well as the carbonates and bismuth phenols, are insoluble in water; they pass through the healthy stomach undecomposed. Should fermentative action be going on in the stomach owing to abnormal conditions, the result is that small quantities of phenols are separated out which suppress the fermentation. For this particular purpose guaiacol carbonate and creasote carbonate are especially adapted, since they induce appetite at the same time.

In the intestine the salols, carbonates, and bismuth phenols are decomposed into their powerfully antiseptic constituents: thus, salol into salicylic acid and phenol; betol into salicylic acid and β naphthol; guaiacol carbonate into guaiacol and carbonic acid; tribromo-phenol-bismuth into tribromo-phenol and bismuthic oxide. Hence, upon this decomposition greatly depends their remarkable action, which varies according to the nature of the constituents, the greater or less rapidity of decomposition, and the absorption of the decomposition products.

Salol, for example, as already stated, yields salicylic acid and phenol, and is, therefore, a specific against rheumatic fever. For a similar reason, owing to its decomposition products, guaiacol carbonate and creasote carbonate are specifics in phthisis (*Berl. Klin. Wochenschrift*, 1892, No. 3).

The decomposition of salol occurs in the commencement of the small intestine; that of guaiacol carbonate, on the other hand, is spread over the whole of the small intestine, and is no longer traceable at the commencement of the larger intestine, a point which suggests its use when an antiseptic action is especially required in this region, as, for example, in typhoid fever.

We are indebted to Dr. F. Hoelscher ("Sanitäts Rath") for a private communication, in which he states that guaiacol carbonate has done good service in cases of typhoid fever at the Dreikönig's Hospital at Mülheim-on-Rhine.

I.

THE "SALOL" GROUP.

THE salols most in use are :—

Salol (phenol combined with salicylic acid), white crystalline powder, m. p. 42°—43° C.

Betol (β naphthol combined with salicylic acid), white crystalline powder, m. p. 95° C.

Benzo-naphthol (β naphthol combined with benzoic acid), white crystalline powder, m. p. 110° C.

Para-cresalol (Para-cresol combined with salicylic acid), white crystalline powder, m. p. 40° C.

Oleo-creasote (creasote combined with oleic acid), amber-coloured oil.

These drugs are insoluble in water, soluble in fatty oils, alcohol, glycerine, etc. ; they pass through the stomach unchanged ; they do not interfere with the digestive process as the free phenols do, because, in contrast to the free phenols, they are neutral, odourless, tasteless, non-caustic, and, indeed, without action on the mucous membrane. In the intestine they are decomposed into their active constituents ; thus, *salol* into phenol and salicylic acid; *betol* into β naphthol and salicylic acid, and so on. Now, whereas these products of decomposition, if separately administered, would induce poisoning, they may both be taken in the form of *salol* in large quantities without danger, for the reason that the caustic phenols, when separated, are immediately absorbed, so that any accumulation of free phenol in the intestine and consequent poisoning is not possible.

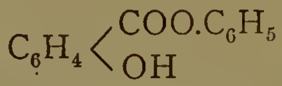
The therapeutic action of the salols depends upon the action of these separated constituents.

Salol possesses the therapeutic action of phenol and salicylic acid.

Betol possesses the therapeutic action of β naphthol and salicylic acid.

Benzo-naphthol possesses the therapeutic action of β naphthol and benzoic acid.

SALOL.

Salol,  $C_6H_4\left\langle\begin{matrix}COO.C_6H_5\\OH\end{matrix}\right.$ according to Prof. Sahli, is an antiseptic substance which has the remarkable property of not losing its action even when dissolved in fatty oils. After the administration of salol the quantity of urine increases: it becomes aseptic and antiseptic, and usually assumes a dark colour, since the decomposition products of salol are eliminated by the urine.

Salol is the best substitute for salicylic acid, and sodii salicylas, possessing as it does all their therapeutic virtues without their disadvantages. Salol does not interfere with the digestion, nor upset the stomach, like sodii salicylas does; neither does the patient suffer so much from buzzing in the ears, and similar symptoms, and, at the same time, the action of salol is more intense than that of sodii salicylas. Prof. Nencki has demonstrated that salol can be taken for prolonged periods without discomfort.

The uses of salol are numerous.

1.—Salol in Rheumatic Affections.

(Prof. Sahli.)

Dose for adults:—15 grains repeated from three to five times a day. The fever, the swelling of the joints, pains, and other acute symptoms cease in acute rheumatic fever after twenty-four to forty-eight hours (Dr. Rosenberg, Dr. Georgi, *Berl. Klin. Wochenschrift*, 1887, Nos. 9 and 10). Smaller doses of salol are then given up to complete recovery (one to two weeks); ½ to 1 drachm per day is sufficient to prevent relapse. Frequently, however, this dose may be considerably exceeded, and 2 or 2½ to 3 drachms may be prescribed per diem for a long time without ill-effect.

Dose for children:—¾ to 1 drachm in 15 grain doses at intervals of two or three hours. As soon as the urgent symptoms have abated the dose may be diminished to 30 grains, and finally 15 grains daily (Prof. Demme, *Report of Jenner's Hospital for Children*, Bern).

If these diminished doses are administered during two to four weeks, no relapse occurs. In cardiac complications salol is also of good service.

That *salol* is superior to salicylic acid and to the soluble salicylates is confirmed by the above and many other physicians—for instance, by Dr. Herrlich and Dr. Aufrecht (*Deutsche Med. Wochenschrift*, 1888, No. 2); by Dr. Lépine (*Lyon Medicale*, July, 1888); by Drs. C. H. Sauer (Brooklyn), J. E. Dawnity (St. Louis), White-Danbury (Connecticut), Behm (Magdeburg), and J. Kimura, of Japan.

Dr. Vernon (*Brit. Med. Journ.*, 1892, February 13th) succeeded in curing gonorrhœal rheumatism of the knee with salol after other means had failed.

2.—Salol in Diarrhœa.

Prof. Dujardin-Beaumetz, of Paris, characterizes salol as the best of intestinal antiseptics.

Diarrhœa of almost every kind is checked by salol, and opium becomes unnecessary, the abdominal pain being relieved by the salol alone. It is perfectly safe, and, therefore, eminently useful, in the treatment of children (Dr. M. H. Fussell, *Therap. Gazette*, 1892, p. 508).

Dr. E. L. Varsaut, Chief of the Medical Clinic, in Philadelphia, employed salol in diarrhœa in the case of children only a few months old, and with the same success as in adult cases.

The salol is given in small doses every two hours. In a bad case of diarrhœa the frequent motions, pains, and colic ceased after the second dose, and in twenty-four hours the patient was practically cured. The treatment must be continued, however, for some days after recovery (Dr. F. H. Goelet, *New York Med. Journ.*, August 6th, 1887).

In *summer diarrhœa* in children Dr. Goelet recommends two-hourly grain doses, and Dr. O. J. Osborne 4-grain doses every two hours (*New York Med. Journ.*, April 7th, 1888).

Complete cure of *chronic diarrhœa* in children has also been effected by means of *salol* (Dr. Hesselman of Mensi).

If salol be administered at a sufficiently early stage, and the diet is properly regulated, summer diarrhœa and dysentery cease to be dangerous (Goelet). Dr. Goelet is further of opinion that salol is by far the best remedy for *flatulence*, from whatever cause arising.

3.—Salol in Dysentery.

Salol has been employed with excellent results in dysentery by Dr. Varsaut, Chief of the Medical Clinic, in Philadelphia; and also by Dr. Goelet, Dr. Kimura, and others. Dr. R. B. McCall, of Georgetown, Ohio (*St. Louis Medical Brief*, November, 1888), effected a cure in the case of a boy of five years of age, and of weakly constitution, after the unsuccessful use of opium, calomel, ergotine, bismuth, etc., by the administration of *salol* (2 grains every two hours). Improvement was indicated on the first day, and the patient recovered after fourteen days' treatment. Dr. Osborne, of New Haven, recommends 4 grains every two hours in these cases.

4.—Salol in Typhoid Fever.

Dr. Hirtz and Dr. Goelet both recommend salol in cases of typhoid, and state that the odour of the fæces was suppressed by its use, and that there was no colic and flatulence due to accumulation of gases in the intestines.

5.—Salol in Cholera.

Prof. Hueppe, of Prague, first suggested the use of salol in cholera, and it was later tried by Prof. Loewenthal, of Paris, and by Dr. James Couldrey (*Brit. Med. Journ.*, August 6th, 1892).

Dr. Salvator, of Tambeles, Philippine Islands, cured fifty out of fifty-three cases of cholera with salol.

According to Hueppe (*Berl. Klin. Wochenschrift*, 1893, p. 162), salol was proved to be a first-rate antiseptic both at Hamburg (Dr. Eisenlohr) and in Astrachan (Dr. Hahn) in slighter cases of cholera.

6.—Salol in Yellow Fever.

Dr. Ferreira obtained very encouraging results with salol in this connection.

7.—Salol in Leprosy (*Lepros*).

1.5 to 2 drachms of salol daily taken in doses of 15 grains, cut short the fever of leprosy almost immediately (Dr. Lutz, Honolulu).

8.—Salol in Genito-Urinary Affections.

After taking salol the urine becomes acid and antiseptic, and frequently has the appearance of carbolic acid urine, but without any serious symptoms whatever. For these affections salol may be advantageously combined with copaiba balsam or sandal wood oil.

Vesical catarrh, pyelitis, and gonorrhœal cystitis have been easily and completely cured by salol (15-grain doses), according to the following authorities:—Dr. Feilchenfeld; Prof. Demme, of Bern; Dr. Leopold Caspar (*Therap. Monatshafte*, 1887, No. 2); Dr. B. Arnold (*Loc. Cit.*, 1888, No. 7); Dr. Ch. Salomon, Hirtz, Dreyfous, and many others.

In Gonorrhœa, painful micturition and scalding cease in a few days, and may be completely cured in a week, even in chronic cases, by administration of salol, *without injections* (Dr. Ernest Lane, Surgeon to the Lock Hospital, London; Dr. Vernon Jones, *Brit. Med. Journ.*, February 13th, 1892; and many others).

Dr. William White, speaking at the American Syphilographical Society, said that out of fifty cases of urethritis treated with salol, the discharge in thirty-five cases was completely arrested within a week from the commencement of the treatment.

9.—Salol for Diagnostic Purposes.

Ewald and Sievers assert (*Therap. Monatshafte*) that under the conditions of normal digestion salicylic acid can be detected in the urine in one hour after the administration of salol. If its appearance is delayed beyond this time, *dilatation of the stomach* is indicated. If the salol cannot reach the intestine, salicylic acid is not to be found in the urine at all. Under these circumstances *stricture of the pylorus* may be diagnosed (*Brit. Med. Journ.*, June, 1890).

10.—Salol in Pulmonary Tuberculosis.

Grossi obtained favourable results after hypodermic injection of a mixture of 10 grains of salol and 10 grains of sweet almond oil daily, in quantities of 5 grains at a time, commencing with one injection up to three daily later on.

11.—Salol in Diabetes.

Dr. Nicolaier demonstrated in the Medical Clinic, at Göttingen, that salol in doses of 30 grains three times daily exerted a most favourable action in many, and even in severe, cases of diabetes, especially with a mixed diet; hence, in those cases where an anti-diabetic régime cannot be carried out it would seem to be most useful. It is, however, contra-indicated in the presence of albuminuria or nephritis (*Therap. Monatshafte*, 1893, p. 102).

12.—Salol Externally as a Substitute for Iodoform.

Salol really acts better than iodoform, since it is odourless, non-poisonous, antiseptic, and diminishes the discharge, cleans the wound, and promotes granulation and scarring.

Ulcers, such as chronic sluggish ulcers of the leg, suppurating surfaces, parasitic sycosis, which resist all other treatment, and gangrenous wounds may be healed by dusting with a powder consisting of 3 grains salol and 50 grains starch, or salol and Talcum venetum (*vide* Dr. Eugen Grätzer-Sprottau, Prof. Demme, 24 *Jahresbericht aus dem Jennerschen Kinder-Hospital zu Bern*, pp. 36-44; Corner, *Journal of the American Medical Association*, June 8th, 1889).

Contagious impetigo, pustular eczema, and other skin affections may be healed by the assistance of the above powder, or the following liniment may be used:—

℞. Kalii carbon.	1
Olei Olivæ	10
Zinci oxid.	15
Starch	15
Saloli	5
Sulfuris	6
Lanolin *q. s. fp*	100 Misce.

According to Saalfeld (*Journal of Cutaneous and Urinary Diseases*, 1889), the results obtained in surgery, embracing all kinds of operations, were superior to those obtained by the use of iodoform (Dr. Patein, Dr. M. Perrier, *Surgical Review*, 1887, No. 519).

Salol in Rhinolaryngology.

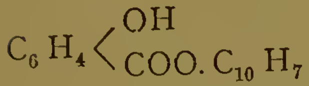
Drs. Gougenheim; Caport, of Brussels; Seifert, and others treated suppurative tonsillitis, stomatitis, ulceration of the mouth and pharynx, angina, and chronic diphtheria most effectually with salol.

Dr. Thorner, of Cincinnati (*Lancet*, December 10th, 1887), found that relief was afforded by 9—12 grain doses three times a day, even in painful cases, of acute catarrhal pharyngitis, involving the whole pharynx and nasal pharynx.

Salol in Ozæna.

Cozzolina recommended insufflation of a salol powder.

BETOL.

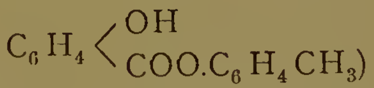
Betol ("Heyden"). Salicylate of β naphthol,  $C_6H_4\left\langle\begin{array}{l}OH\\COO.C_{10}H_7\end{array}\right.$ *perfectly* free from taste or smell.

According to Prof. Kobert, Dorpat, betol is devoid of any injurious action on the digestion or otherwise. It agrees with the patient better than salol, and is employed in a similar manner.

In acute rheumatic fever 15—30 grains three to five times per day (Sahli, *Therapeutische Monatshafte*, 1887, p. 212; Dr. Clarke, *The Practitioner*, Dec., 1888).

In intestinal diseases (dysentery, etc.), as an intestinal antiseptic in vesical catarrh of gonorrhœal origin, 5—8 grains four times a day. The alkaline urine becomes quickly acid, and pain is alleviated (Kobert, *Therapeutische Monatshafte*, 1888, p. 220).

PARA-CRESALOL.

Salicylate of Para-cresol,  $C_6H_4\left\langle\begin{array}{l}OH\\COO.C_6H_4CH_3)\end{array}\right.$ Acts in a similar manner to, and is still less injurious than, salol, since in the intestine, in place of phenol, para-cresol is separated, which, according to Dr. Hanmar's experiments made in the Hygienic Institute of the University of Prague, is about four times less poisonous, and at the same time about ten times stronger as an antiseptic, than phenol.

Prof. Sahli gives in rheumatic fever and vesical catarrh 1—2 drachms daily in divided doses.

As an intestinal antiseptic it works better than salol (Prof. Nencki).

BENZO-NAPHTHOL ("Heyden")

(*Benzoate of β Naphthol*) possesses, like *betol*, the virtues of β naphthol, without its disadvantages, for it is an odourless, tasteless, neutral, non-caustic, and non-poisonous drug which breaks up in the intestine into benzoic acid and naphthol, and, by virtue of these decomposition products, disinfects the intestine. It is therefore much used in diseases of the intestinal tracts, from simple diarrhœa to typhoid fever (Dr. Golbert, Paris; Prof. Brück, Budapesth, 1892; Prof. Ewald, Berlin; *Berl. Klin. Wochenschrift*, 1892).

OLEO-KREOSOTE ("Heyden")

(*Oleate of Creasote of Beechwood Tar*) acts and is employed in a similar manner to creasote, but may be taken in larger doses without repugnance, and is much less poisonous than creasote, or than a simple mixture of oil and creasote, since it contains no free caustic and poisonous creasote. *Oleo-creasote* contains about 50 per cent. of creasote chemically combined; it is neutral, non-caustic, and has a much more agreeable odour and taste than creasote.

Oleo-creasote ("Heyden") may also be employed as a subcutaneous injection without inconvenience (Prof. Prevost Genf, *Revue Medicale de la Suisse Romande*, 1893, No. 2).

II.

THE "CARBONATE" GROUP.

THE "*carbonates*" include a group of non-toxic remedies, which, like the salols previously described, have emanated from the Scientific Laboratory of the Chemical Factory of Dr. F. v. Heyden's Successors at Radebeul, near Dresden, Germany.

The "*carbonates*" contain therapeutically active phenols, chemically combined with carbonic acid. Like the salols, they pass through the stomach unchanged, and in the intestine are decomposed into their constituents: thus, for example, guaiacol carbonate into guaiacol and carbonic acid. The small quantity of carbonic acid which is separated exerts practically no action, but, owing to its presence, the full therapeutical effect of the phenols is ensured without their unpleasant and poisonous properties being in any way indicated.

The most important "carbonates" are:—

Guaiacol carbonate.
Creasote carbonate.
Eugenol carbonate.
Chlorophenol carbonate.
Pyrocatechin carbonate.

GUAIACOL CARBONATE (" Heyden ").

Hitherto this is the best known remedy for tuberculosis, and contains 91 per cent. chemically pure crystallised guaiacol, chemically combined with carbonic acid. The favourable action of guaiacol—the active constituent of creasote—is well known. This is unfortunately counteracted in great part, owing to the fact that guaiacol is, like all the phenols, poisonous, caustic, and produces an intense irritation of the mucous membrane of the stomach and intestine; and further, owing to its penetrating odour and nauseous taste, is frequently rejected, or with difficulty retained by many patients.

But *guaiacol carbonate*, on the other hand, is absolutely non-toxic (a ten-weeks' old puppy took 5 drachms daily without any discomfort whatever; and patients have taken as much as 2½ drachms daily). It is neutral, non-caustic, and without any irritating action on the mucous membrane of the stomach; it possesses, moreover, neither taste nor smell, nor does it affect the nervous system; hence it may be taken without the slightest difficulty by the most sensitive patient, and for any length of time. A further advantage is that while free guaiacol is a fluid, its carbonate is solid and crystalline (m. p. 80° C.). It can therefore be given in the form of a powder, from 8, increasing up to 75, grains daily, in divided doses.

According to Drs. Seifert and Hölscher, the action of guaiacol is as follows:—The drug passes through the healthy stomach unchanged and without action; in the case of defective digestion small quantities of guaiacol are separated in the stomach itself, which are sufficient to avert any fermentation and other local derangements; hence guaiacol carbonate, in the first instance, regulates the digestive functions, and in the intestine it is decomposed into carbonic acid and guaiacol. The latter is immediately conveyed to the circulation, and there fixes the toxic albumens which may be present in the blood.

By oxidation the poisonous substances produced by the tubercle bacilli, which give rise to the symptoms of the disease, are eliminated from the blood.

In this manner guaiacol carbonate continuously depoisons the blood of consumptives, and, as a consequence, the symptoms of the disease, such as fever, night-sweats, paroxysmal cough, bronchial râles, expectoration, and dulness cease; the appetite and digestion improve, and even large cavities heal in favourable cases.

Rapid recuperation and increase of weight follow, *e.g.*, 25 lbs. in four weeks (*Berl. Klin. Wochenschrift*, 1891, No. 51, and 1892, No. 3).

"There are only two remedies for tuberculosis, and these are:—guaiacol carbonate and creasote carbonate (Prof. Chaumier at the Congress of the 'Association Française pour l'Avancement des Sciènces,'. Paris, September, 1892)."

CREASOTE CARBONATE (" Heyden ").

Creasote carbonate is an insoluble fluid of the consistence of honey, and contains 91 per cent. of creasote from beech-tar, chemically combined with carbonic acid. Just as guaiacol combined with carbonic acid loses all its harmful properties, so creasote, in combination with carbonic acid, is non-toxic, non-caustic, odourless, and almost tasteless. In the intestine it is decomposed into creasote and carbonic acid, and, in fact, possesses the excellent remedial action of creasote without its poisonous and other unpleasant effects. It is taken without repugnance by the patient, and agrees well, whereas creasote from beech-tar, on account of its poisonous nature, its causticity, its offensive odour and taste, and its violent action on the nerves, is rejected by many, or only with difficulty retained. The analogy of the carbonates of guaiacol and creasote are here clearly indicated.

Creasote carbonate is, however, not quite so pleasant to take, and acts somewhat less energetically than guaiacol carbonate; but it is considerably cheaper than the guaiacol carbonate (the production of which is somewhat costly), and is, therefore, better adapted for the needs of patients in moderate circumstances.

The dose of creasote carbonate for children is from 15—90 grains; that for adults 1—4 drachms (troy) daily, according to the condition of the patient.

Its action is similar to that of guaiacol carbonate—

for example, the increase in weight amounted to 6 kilogrammes (about 13 lbs.) in the case of a girl of twenty years of age (Chaumier-Tour's Address to the Acad. de Med., Paris).

The well-known great clinical success of guaiacol carbonate and creasote carbonate makes it highly probable that this new "carbonate" class of drugs will yield other valuable specifics, especially in the direction of intestinal antiseptics.

Cresol carbonate, chlorophenol carbonate, eugenol carbonate, and pyrocatechin carbonate are still under clinical investigation as intestinal antiseptics, and as specifics against infectious disease such as tuberculosis. These carbonates also decompose in the intestine into their constituents, viz., the particular phenol and carbonic acid, as has been demonstrated in the case of eugenol carbonate in the laboratory of Prof. Giacosa in the University of Turin; while naphthol carbonate, on the other hand, passes through the whole system unchanged, and hence, is without any action whatever.

III.

THE GROUP OF "BISMUTH-PHENOLS."

UNDER this general title is included an entirely new class of non-toxic drugs, destined, without doubt, to produce a revolution both in internal and external antisepsis, since they combine in themselves the special therapeutic effects both of the phenols and of bismuth, while, by their combination, they mutually neutralise their respective disadvantages.

One might naturally imagine that antisepsis, pure and simple, might be most completely attained by the agency of those substances belonging to the class of phenols, such as carbolic acid, cresol, naphthol, thymol, tribromo-phenol, chloro-phenol, pyrogallol, etc., but, as previously explained, the employment of these phenols in the free state (especially for internal purposes) is very limited, owing to their toxic action, their causticity, their repulsive odour, their burning taste, and their intensely irritating action on the nerves and mucous membrane. Most unfortunately the poisonous tendency of these phenols exceeds their curative powers, but a complete transformation is effected when, instead of employing them in the free state, they are administered in chemical combination as salols, or as carbonates. Then, as already described, is their wonderful internal action made possible, while their poisonous properties are suspended or annulled.

An absolute analogy obtains in the case of the bismuth-phenols, since it has been found that they represent the curative powers of the phenols themselves, *minus* their disturbing influences. They are, like the salols, practically non-toxic, neutral, non-caustic; they form insoluble white, yellow, and red powders, absolutely free from taste and smell. After introduction into the system they yield the respective phenols, with all their therapeutic value, even more easily than the salols, so that their action is more certain, and, further, the bismuthic oxide which is simultaneously separated fixes the toxic albumen in the intestine.

Naphthol-bismuth ("Heyden)", *tribromo-phenol-bismuth* ("Heyden"), and *cresol-bismuth* ("Heyden") have been employed with the most extraordinary success in diarrhœa, cholera, and typhoid.

As antiseptics, in the treatment of wounds, ulcers, and skin diseases, are especially to be mentioned *pyrogallol-bismuth* ("Heyden") and *phenol-bismuth* ("Heyden").

These new "bismuth-phenols," like the "carbonates," open up to the medical scientist a new field of research, and a ready material for promising clinical experiments.

Phenol-, cresol-, and naphthol-bismuths have been physiologically investigated in the Imperial Institute of Experimental Medicine at St. Petersburg; and later, on the occasion of last year's cholera epidemic in Russia, employed with very good success in choleraic diarrhœa, in lighter cases of cholera, and in other cases of diarrhœa due to bacilli.

According to Prof. v. Nencki, of the Imperial Institute of Experimental Medicine at St. Petersburg, both β-naphthol-bismuth (" Heyden ") and cresol-bismuth (" Heyden ") agreed well with patients even after long-continued use (*Wratsch*, 1893, No. 1). Drs. Schubenke, Blackstein, and Petkewitsch used naphthol-bismuth (15 to 30 grains daily) in Baku in cases of ordinary bacillary diarrhœa and in choleraic diarrhœa, and record recovery in almost all instances, especially in choleraic diarrhœa, without any ill-effects (*Wratsch*, 1892, Nos. 41 and 51).

TRIBROMO-PHENOL-BISMUTH.

The following clinical results obtained by Prof. Hueppe, of Prague, during the late cholera epidemic in Hamburg, and based on the experience of many years' previous experiments of a tentative character, will be seen to be of the greatest importance. From them it may be deduced that *tribromo-phenol-bismuth* ("*Heyden*") is the best intestinal antiseptic (in diarrhœa, typhoid, etc.), and that it is *the specific in cholera.*

Tribromo-phenol-bismuth is a yellow, neutral, insoluble powder, devoid of taste or smell, non-toxic, and without action on the sensitive mucous membranes of the digestive organs.

It contains *circa* 55 per cent. bismuthic oxide, and *circa* 45 per cent. tribromo-phenol, chemically combined with one another.

This neutral drug, which is without irritating action on the mucous membrane, even when affected by disease, and which is free from any indirect injurious action, coats, as demonstrated by experiments, the intestinal mucous membrane which has been laid bare by cholera with a protective film; acts on the cholera bacilli in the intestines by arresting their development or killing them, and converts the cholera poison into a non-poisonous unresorbable form.

"Tribromo-phenol-bismuth is unquestionably superior to calomel" (Hueppe: "Die Cholera in Hamburg," *Berl. Klin. Wochenschrift*, 1893, p. 162).

Use in Lighter Cases of Cholera (pure bacillary diarrhœa, without anuria or kidney affection).—Recovery is certain, easy, and without any complications in a short period by administration of tribromo-phenol-bismuth.

Prof. Hueppe gives 75-100 grains of tribromo-phenol-bismuth daily in the case of adults; if the night nursing is properly regulated, it is most advantageous to give 75 grains in the daytime for the first time; 60 grains during the day in doses of 8 grains, and in the night 15—30 grains, in 8-grain doses, if the patient is awake.

This dosage is adhered to for from two to five days, and then diminished.

In cases of moderate severity (with symptoms of commencing poisoning, anuria, and kidney affection) the secretion of urine recommenced in nearly all cases with comparative rapidity after administration of tribromo-phenol-bismuth. All recovered, with the exception of one case, which cannot fairly be included; at the same time, in this case post-mortem examination showed that the tribromo-phenol-bismuth had not been without effect: the kidneys were almost intact, or, more correctly, had already healed, and cultures from the intestine were completely negative; while, on the other hand, in similar cases, with similar intestinal appearances, but which had not been treated with tribromo-phenol-bismuth, or only with infusion, many active comma bacilli were invariably found.

Of *severe cases* (sheer poisoning, asphyxiated condition) Prof. Hueppe was only able to treat eleven with tribromo-phenol-bismuth; the urine secretion recommenced in all cases comparatively quickly. The mortality was 45 per cent. Post-mortem examinations gave negative cultures, and the kidneys were obviously little affected, in marked contrast to those cases in which tribromo-phenol-bismuth had not been used, or which had only been treated with infusion.

Tribromo-phenol-bismuth has shown itself, therefore, of service even in severe cases, so that it is valuable as an adjunct to infusion (Extract from Hueppe, "Die Cholera Epidemie in Hamburg," *Berl. Klin. Wochenschrift*, 1893, No. 7).

N.B.—All *non-toxic drugs*—salols, carbonates, and bismuth-phenols—have been discovered in the scientific laboratory of the chemical factory of Dr. F. v. Heyden's Successors, and patented by them throughout the civilised world.

Particulars and samples will be promptly furnished on application to the above firm, Radebeul, near Dresden, Germany.

APPENDIX.

NON-TOXIC DRUGS.

Solveol—A DISINFECTANT FOR EXTERNAL USE.

Solveol is not, strictly speaking, a non-toxic drug, since, if given in large doses undiluted, it exerts a poisonous action. It belongs, however, in a certain sense, to the class of non-toxic drugs, since, when *externally* employed as an antiseptic in the treatment of wounds, skin diseases, etc, as a substitute for corrosive sublimate or carbolic acid, its action is almost non-toxic. Solveol might be termed "*de-poisoned*" *carbolic acid.*

Dr. Hammer, of the Hygienic Institute of the University of Prague, demonstrated that a solveol solution, containing 0.5 per cent. cresol, has an equally powerful antiseptic action as a 5 per cent. solution of carbolic acid. Since cresol is only one-half as poisonous as carbolic acid, it follows that *solveol is twenty times less poisonous than a carbolic acid solution of the same antiseptic power.*

This indicates, practically speaking, that solveol is almost non-toxic; in any case, the use of solveol will exclude the frequently observed poisonous action of carbolic acid.

In the Imperial Board of Health in Berlin it has been proved that a solveol solution, containing 0.09 per cent. cresol, rendered the development of very resistant anthrax spores impossible.

In addition to this non-toxic action, notwithstanding its remarkable antiseptic power, it has still other advantages.

Solveol does not make the hands acid like sublimate, nor numb like carbolic acid, and has a much less caustic action on wounds. Solveol contains no soap, and is, therefore, not slippery like Creolin and Lysol, which, in consequence of their soapy nature, render the instruments, hands, and operating field slippery, thus making a lengthy operation uncertain or even impossible.

Solveol is miscible with any spring water to a clear solution, while corrosive sublimate and Lysol form precipitates with such water on account of the calcinous salts contained in such water. The effect of the solveol is not lessened in fluids containing albumen, as is the case with sublimate.

Dr. Hiller sums up the excellent qualities of solveol as a substitute for sublimate and carbolic acid as follows:—" Solveol is the most agreeable antiseptic I have ever used" (*Deutsche Med. Wochenschrift*, 1892, No. 37).

For surgical use the following strength of solveol solution is advisable: about 37 c.c. solveol in 2 to 4 litres of water. This solution replaces the poisonous 2 to 5 per cent. carbolic acid solution (37 c.c. solveol always contain 10 grammes of cresol, which has been rendered soluble in water by means of cresotate of soda).

Dr. Hammer (*Archiv für Hygiene*, Vols. XII. and XIV., Part I.), Prof. Dr. Hueppe (*Berl. Klin. Wochenschrift*, 1891, No. 45), and Dr. Hiller (*Deutsche Med. Wochenschrift*, 1892, No. 37).

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